REMARKS

Claims 1 and 3-14 are pending. Claim 1 has been amended to more clearly define the homogeneous distribution, suitable substrates and suitable catalysts. Support for amended Claim 1 can be found at, for example, Example 1 and paragraphs [24] and [33]. Entry of this Amendment is respectfully requested.

Statement of Substance of Interview

Applicant thanks the Examiner for granting the telephone interview on October 21, 2009, wherein Applicant's representative directed the Examiner's attention to the paragraphs [24] and [33], wherein suitable catalysts and substrates are disclosed. Applicant's representative further presented Applicant's argument that radiation was not required. The Examiner indicated that the claims were enabling only for composites formed via the sol-gel process since it was the only process disclosed in the specification for making the composite having the catalyst particles homogeneously dispersed therein. The Examiner agreed that radiation was not required for absorbing mercury from the fluid as covered by the alternative expression "or" in Claim 1

In addition, Applicant's representative and the Examiner discussed amending Claim 1 to clarify "homogeneously as meaning that the catalyst particles were disposed both in solid portions of the substrate as well as on surface portions of the substrate to patently distinguish over Zhang et al which disclosed catalyst particles dispersed homogenously only on surface portions of a porous silica gel substrate.

Response to Claim Rejections Under § 112

Claims 1 and 3-7 are rejected under 35 U.S.C. § 112, first paragraph, for assertedly failing to comply with the enablement requirement.

Claims 1 and 3-7 are also rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

As noted above, Claim 1 has been amended to recite suitable substrates and suitable catalysts. Moreover, radiation is not required for absorbing mercury from the fluid as covered by the alternative expression "or" in Claim 1. Thus, Claims 1 and 3-7 meet all of the requirements of § 112. Accordingly, withdrawal of the rejections is respectfully requested.

Response to Claim Rejections Under § 103

Claims 1, 3, 4, and 6-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Brym in view of Zhang et al.

Claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Brym in view of Zhang et al as applied to claim 4 above, and further in view of Burns et al.

Applicant respectfully traverses.

The present claims relate to a method for removing mercury from a fluid stream, comprising the steps of: providing a composite material comprising a substrate and catalyst particles; and contacting a fluid stream with said composite, wherein said composite adsorbs and/or oxidizes said mercury. Further, the catalyst particles are homogeneously dispersed both in the solid portions of the substrate and on the surface portions of the substrate. In this regard, Applicant discloses at paragraph [27] that the composite material preferably consists of a high surface area substrate material, for example, a silica-gel impregnated with photocatalyst particles, such as TiO_2, thereby forming a SiO_2-TiO_2 composite gel. In other words, according to the present invention, the catalyst is within the substrate matrix where it cannot be attrited.

As demonstrated by Working Example 1 of the present specification, a silica-titania composite is formed wherein TiO_2 was well distributed in the SiO_2 matrix, forming chemical

bonds with the silica matrix. Accordingly, a new "composite" material is created, consisting of silica-titania bonds. In this regard, Applicants disclose at paragraph [31] that the silica-titania composites are made by a sol-gel method using nitric acid and hydrofluoric acid as catalysts to increase the hydrolysis and condensation rates, thereby decreasing the gelation time. Applicants further disclose that in preparing the silica-titania composite, a known mass of Degussa (Dusseldorf, Germany) P25 TiO_2 is added to a batch and a magnetic stir plate is used to provide sufficient mixing, while care is taken to insure that the TiO_2 is well dispersed in the sol and that the homogeneous distribution of TiO_2 is maintained throughout the gelation process. In other words, according to the present invention, TiO_2 is homogeneously mixed into a liquid substrate, wherein the homogeneous mixture is maintained while the composite hardens. Thus, a composite material is formed wherein the catalyst materials are homogeneously dispersed both in the solid portions of the substrate and on the surface portions of the substrate, as presently claimed.

In contrast, Brym discloses a means of removing mercury from a fluid stream wherein the filter means includes multiple compartments with purification media therein with two of the compartments including plates coated with a photoactivated catalyst (e.g., titanium oxide). *See,* col. 6, line 66 and Abstract. Brym further discloses that the plates are preferably glass or ceramic plates. *See,* col. 8, lines 48-49. Thus, the TiO_2 of Brym is on the surface of the substrate and could be easily attrited.

Zhang discloses at col. 10, lines 32-51, a method for preparing a photocatalyst supported on adsorbent support material, whereby a solution comprising titanium isopropoxide (TIP) is admixed with an adsorbent support material for a period sufficient to coat the support material with a desired amount of TIP, and the coated support material is placed in a humid environment

for a period sufficient to hydrolyze the TIP onto the support material (e.g., the admixed TIP/support material can be periodically agitated or mixed during a period of about 24 hours, and the coated support material may then be placed in a humid environment for about 48 hours to hydrolyze the TIP onto the support material).

Similarly, Zhang discloses at col. 5, lines 30-31 and col. 10, lines 3-11, a method for preparing a photocatalyst affixed to a particulate support material, whereby an aqueous slurry of photocatalyst particles is admixed with a particulate support material for a period sufficient to coat the outer surface of the support material with a desired amount of the photocatalyst. Thus, the TiO_2 of Zhang is on the surface of the substrate and could be easily attrited.

Even if, as the Examiner asserts, the substrate of Zhang can have a network of interconnecting pores that would be impregnated with titanium dioxide, the process steps of Zhang would not result in a composite material comprising a substrate and catalyst particles, wherein the catalyst particles are homogeneously dispersed both in the solid portions of the substrate and on the surface portions of the substrate, as presently claimed.

Accordingly, Applicants respectfully submit that one of ordinary skill in the art, upon reading Zhang would not arrive at a composite material wherein the catalyst particles are homogeneously dispersed both in the solid portions of the substrate and on the surface portions of the substrate, as presently claimed.

Burns fails to make up for the deficiencies of Brym and Zhang discussed above.

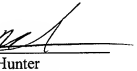
Accordingly, Brym, Zhang and Burns fail to anticipate or render obvious the present claims. Withdrawal of the rejections is respectfully requested.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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